Brief Look: Ozone at Cowpens National Monument

1989-2007

The Cowpens NM ozone monitoring station has been recording data since 1989. Since roughly 1999 the ozone concentrations and number of exceedances have been going down. The 3-year average plot (Figure 1) makes this recent trend look fairly regular and shows the last 4 years as being below the ozone standard. The annual plot of 4th highest 8-hr ozone (figure 2) shows a bit more variation. Just looking at the number of days (Figure 3) when ozone exceeded 85 ppb each year gives a better sense of the extreme variability from year to year. Although the Cowpens NM monitor now shows the ozone air quality to be below the current ozone standard, the concentrations are just back down to the early 1990's levels. If the ozone standard is lowered in EPA's announcements later this summer, then current concentration will be borderline. The overall trend for the life of the monitor at Cowpens in no change.

Removing the ozone monitor from Cowpens is premature both for assuring that the area doesn't exceedance the ozone NAAQS and for determining the trend. If the decrease in ozone since 1999 is from emission cutbacks due to the NOx SIP Call then ozone concentrations may continue to go down. If the change has been due to a climate variation the concentrations could easily jump to above the standard as seen in 2002 to 2003.

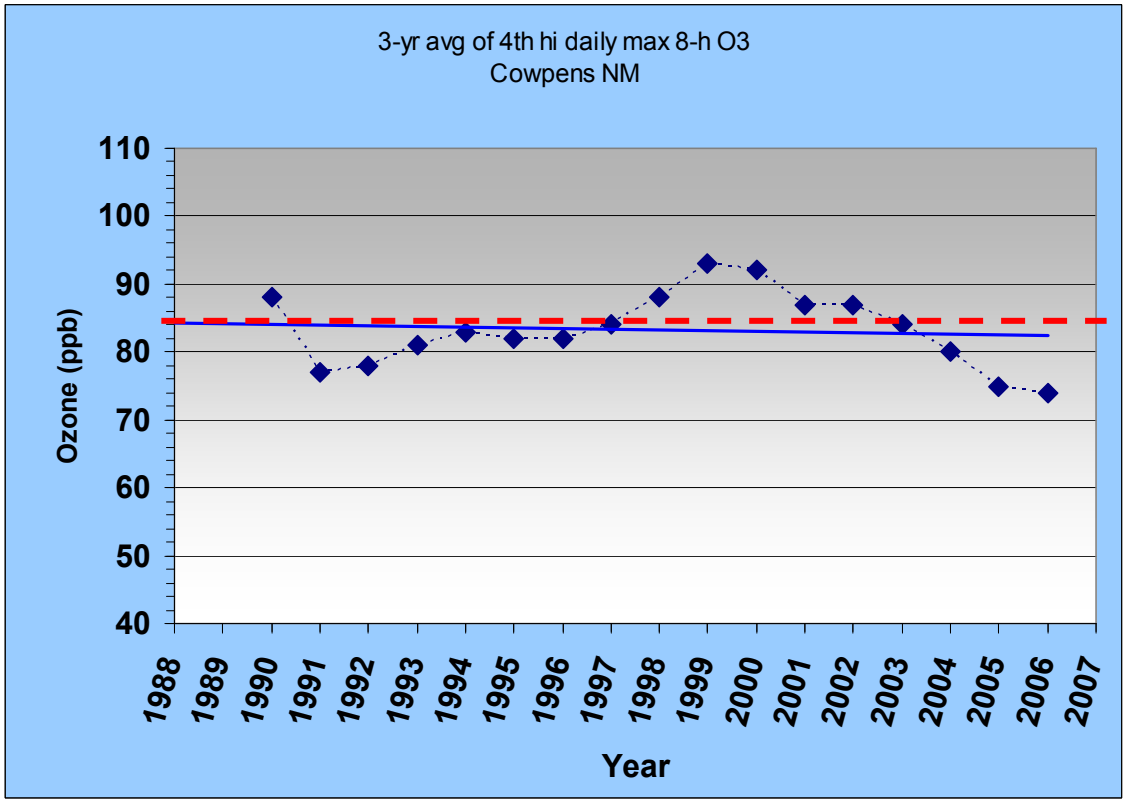


Figure 1.

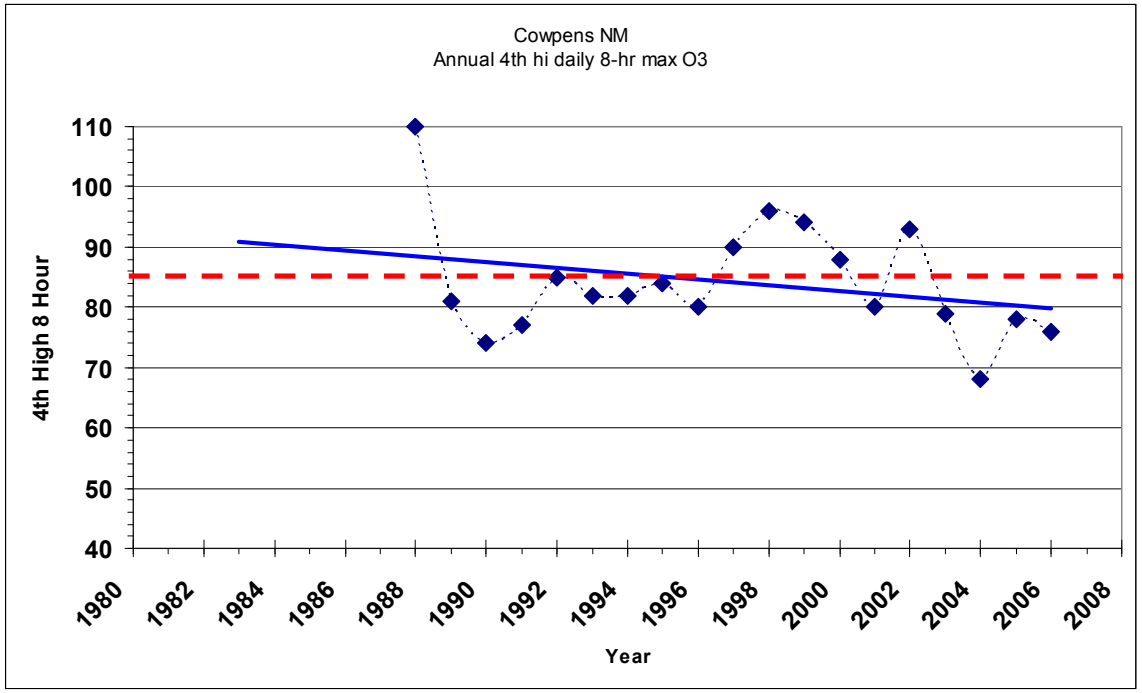


Figure 2.

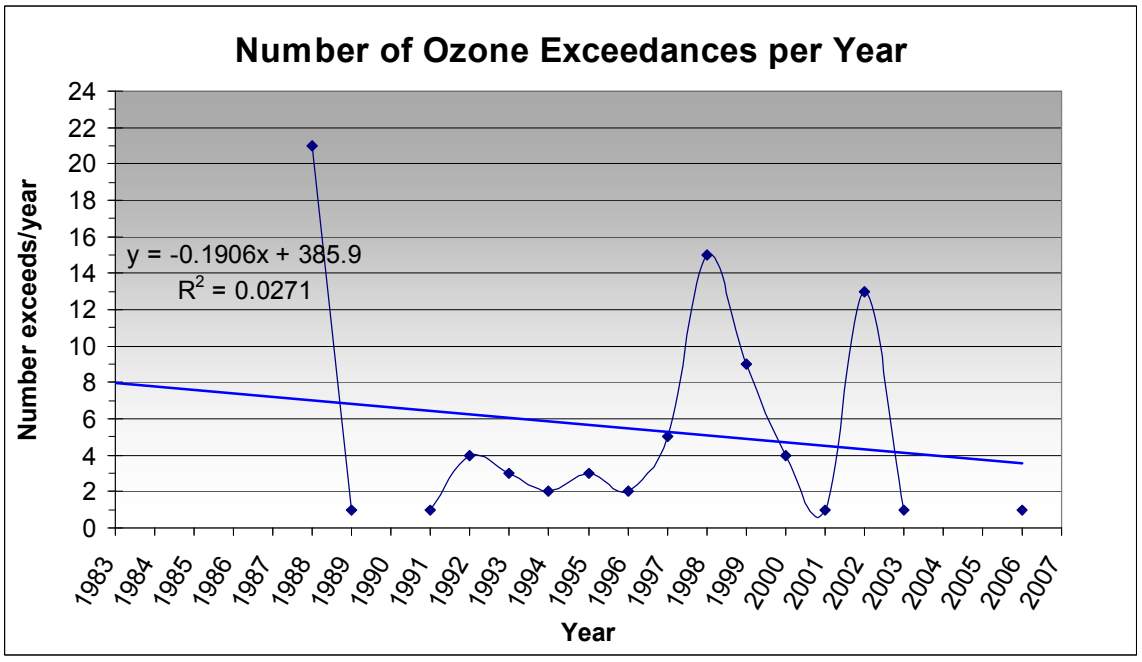
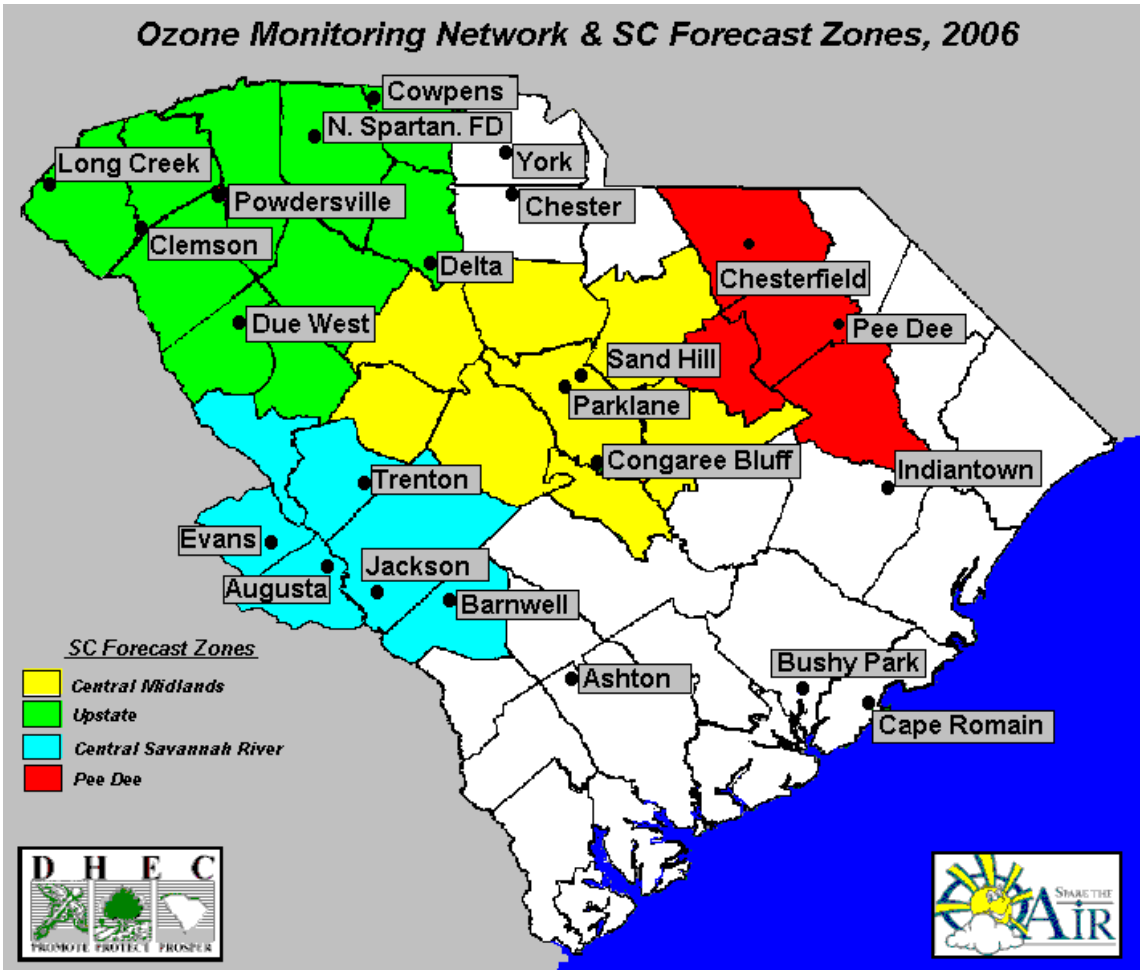


Figure 3.

The Cowpens station sits at the edge of a non-attainment area and is the only rural monitoring station in the area. None of the existing ozone monitors in South or North Carolina could substitute for the Cowpens NM monitor.


Ozone Monitoring Network & SC Forecast Zones, 2006
Cowpens
N. Spartan. FD
York
Long Creek
Powdersville
Chester
Clemson
Delta
Chesterfield
Due West
Pee Dee
Sand Hill
Parklane
Congaree Bluff
Indiantown
Trenton
Evans
Jackson
Augusta
Barnwell
Ashton
Bushy Park
Cape Romain
SC Forecast Zones
Central Midlands
Upstate
Central Savannah River
Pee Dee
D H E C
PROMOTE PROTECT PROSPER
Share the Air
Figure 5.

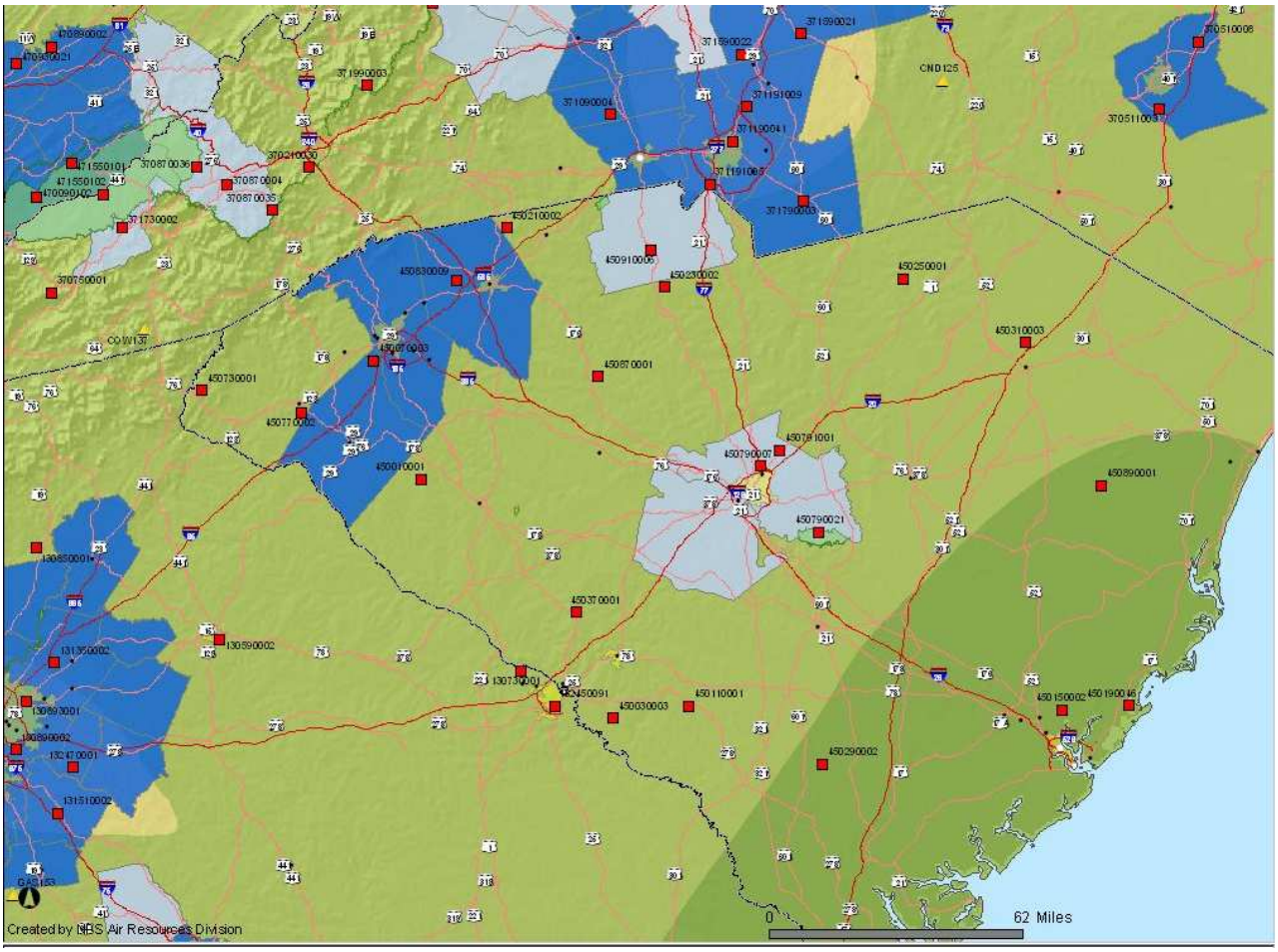


Figure 6. Location of ozone monitors in the area. (Red squares are State; yellow triangles are CASTNet)

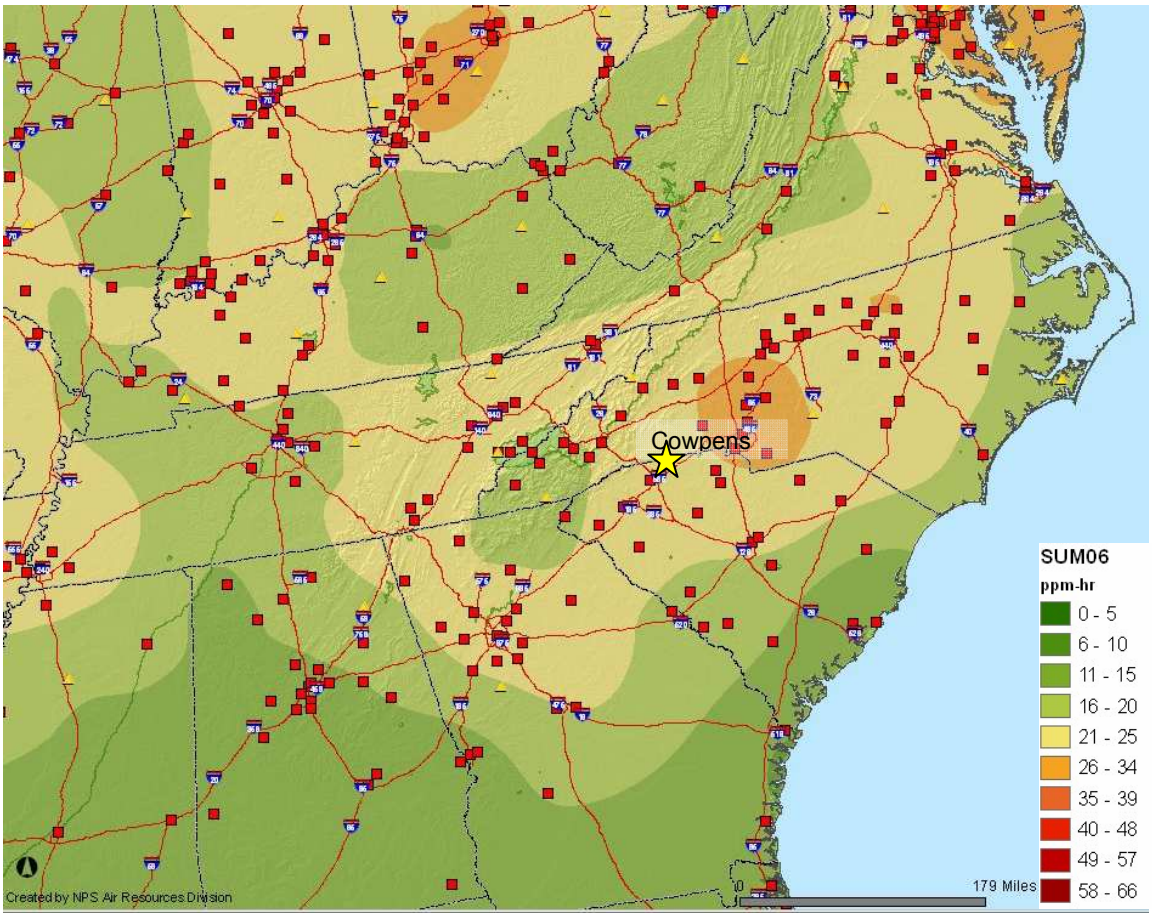


Figure 7. Map of SUM06 cumulative ozone from NPS Air Atlas (2000-2005 average). Cowpens is in the 21-25 ppm-hr contour which above the values expected to lead to vegetation injury.

Conclusion

Ozone concentrations at Cowpens National Monument are elevated over what would be expected in rural areas in the East and are considerably over expect background conditions. The station has shown multiple daily exceedances of the NAAQS in the recent past and violated the standard for at least six years. SUM06 ozone, which is a good indicator of possible ozone injury to natural resource vegetation, is well above the threshold of about 12 ppm-hr when injury begins to show up. Although current ozone measurements are below the standard, it seems premature to remove the station.

J. D. Ray
6-7-07